

## **REMARKS**

### **FORMAL MATTERS:**

Claims 1-26 are pending after entry of the amendments set forth herein.

Claims 1, 9-11, 13, 14, 16, 18 and 23 are amended. Support for these amendments is found throughout the Specification and the claims as originally filed. The amendments to claims 9-11, 13, 14, and 16 are formal in nature and are made to correct minor errors. Support for amendments to Claim 18 is found at least in the originally pending claims 7 and 8. Amendments to claim 23 are supported in original claim 1, Figure 1 and through the application.

### **INVENTION COMPARED TO PRIOR ART IN GENERAL:**

The present invention is a method which is used to form particles by breaking up a first stream of a liquid by forcing a second stream against the first stream and violently disassociating the first stream. The cited prior art forms particles from a first stream by using a second stream to stabilize and substantially reduce the diameter of the first stream and then allowing the stabilized and compressed first stream to disassociate by a process referred to as Raleigh break-up. In general, when a stream normally disassociates based on Raleigh break-up the particle diameter is approximately one half the diameter of the stream used to form the particles. However, via the method of the present invention the violent forcing of one stream against another can form particles which are substantially smaller as compared to the particle size obtained by normal Raleigh break-up. The details of how specific elements of the claimed invention are distinguishable from the specifically cited prior art are discussed below.

No new matter is added.

### **INFORMATION DISCLOSURE STATEMENT:**

The Information Disclosure Statement filed January 29, 2004 is being resubmitted in order to comply with 35 C.F.R. §1.98(a)(1). As there are no additional references being submitted, applicants believe there is no fee due in connection with the resubmission of this document. The rejection is hereby rendered moot.

**REJECTIONS UNDER §112, ¶2**

Claims 9-11 and 13-15 are rejected under 35 U.S.C. §112, second paragraph as being indefinite.

The Applicants have amended Claims 9-11, 13, and 14 to include “the diameter of” as the Examiner proposed and Claim 16 to include “the volume of”. The Applicants note that Claim 15 already includes a specific parameter – “the diameter of the second channel opening . . .”

As shown in Figure 1 and referred to in paragraph [0068] the pressure chamber 2 includes a channel 13 which surrounds the exit 6 of the supply means 3. The “first channel” in claim 12 is the first channel 13. This channel 13 is also shown in Figure 3. However, in Figure 3 it can be seen that the diameter “D<sub>o</sub>” which is the diameter of the exit opening is smaller as compared to the diameter of the first channel opening for the channel 13. This is the type of embodiment being referred to within claims 13-15.

The Examiner alleges that Claims 7, 8, 16 and 17 fail to define any further method steps to achieve the alleged end results.

Applicants are claiming a method and that method includes specific steps of moving fluids in a specific manner in order to obtain a specific result. In accordance with the claimed method a first fluid stream is disrupted by a second fluid forced against the first fluid stream. The speed at which the fluids interact with each other effects the results obtained. By forcing the fluids against each other at very high rates such as a rate which approaches the speed of sound a different result is obtained as compared to forcing the fluids towards each other at substantially slower rates. Accordingly, the limitations of claims 7 and 8 relating to the speed of the fluids effect the results obtained and are further limitations on the method claimed by applicants.

With respect to claim 16 applicants again point out that applicants are claiming a method which involves moving fluids in a particular manner. When the fluids are moved together in a particular manner they form particles. The particles formed have a diameter and the diameter of those particles is what is being defined within dependent claim 16. If the particles formed have a diameter as defined within claim 16 the method of claim 1 is further narrowed. Specifically, claim 16 narrows to a method

which is carried out by forcing the first fluid and second fluid against each other to form particles having the size as claimed within claim 16.

In view of the above reconsideration and withdrawal of the rejection with respect to claim 16 is respectfully requested.

Applicants' position with respect to claim 17 is essentially the same as with respect to claim 16. The invention claimed is a method. That method requires the forcing of fluids against each other in accordance with the steps claimed. The fluids may be forced against each other in a manner so as to form particles of a size as defined in claim 17.

In view of such reconsideration and withdrawal of the rejection with respect to claim 17 is respectfully requested.

#### **REJECTIONS UNDER §102 - JENNINGS**

Claims 1-18, 21, 22 and 24-26 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 3,463,404 to Jennings ("Jennings").

The rejection states that Jennings discloses forcing a first fluid 16 through a feeding supply means 4. Jennings does disclose a fluid conducting means 4 and a liquid 16 as shown in Figures 1-4. The rejection then states that Jennings discloses filling a pressure chamber 3 with a second fluid (gas). However, Jennings teaches a central recess 3 which surrounds a porous member 9 as shown in Figure 1. The porous member 9 prevents the gas 8 from being in direct, uninterrupted fluid connection with the fluid 16 in the orifice 11. The claims have been amended so that the chamber is in direct, uninterrupted fluid connection with the exit opening of the feeding supply. In Jennings this is blocked by the membrane 9.

In accordance with applicants method the second fluid breaks the first stream into particles having the diameter less than the diameter of the exit opening of the first fluid feeding supply means. Jennings does not teach this. Further, in view of the presence of the porous member 9 the gas 8 cannot

forcefully move against the liquid and break it into small particles as it does in accordance with applicants' invention.

#### **REJECTIONS UNDER §102 – GANAN-CALVO**

Claims 1-18 and 21-26 are rejected under 35 U.S.C. §102(b) as being anticipated by WO 97/43048 to Ganan-Calvo et al. ("Ganan-Calvo").

The undersigned attorney does not speak Spanish and the cited reference to Ganan-Calvo et al. is largely in Spanish. Accordingly, applicants have attached here a copy of U.S. Patent 6,595,202 which is also to Ganan-Calvo and is based, in part, on the Ganan-Calvo reference cited in support of the rejection. The '202 patent includes additional information beyond that of the Ganan-Calvo reference cited in support of the rejection. The Figure 1 of the '202 patent is substantially identical to the figure shown on the face of the Ganan-Calvo PCT publication cited in support of the rejection.

The essence of the invention taught in the Ganan-Calvo reference cited in support of the rejection as well as the '202 patent is to use a fluid such as a gas in order to focus a stream of fluid such as liquid into a narrow **stable capillary jet**. The formation of the **stable liquid-gas interface** forming the stable capillary jet is referred to throughout the Ganan-Calvo reference cited in support of the rejection and the '202 patent. This is very different from forcing streams into each other in order to break a stream into particles as is being achieved by the method claimed in the present application.

In accordance with applicants' invention when the second fluid is forced towards the first fluid it does reduce the circumference of the first fluid stream as per Ganan-Calvo and the '202 patent. However, in accordance with applicants' invention by forcing the second fluid into the first fluid the second stream breaks the first fluid stream into particles. Ganan-Calvo does not use the second stream to break up the first fluid stream. Instead, Ganan-Calvo uses the second stream to stabilize the liquid stream into a stable jet. Further, in accordance with the claimed invention the particles are formed inside the pressure chamber by the second fluid. In accordance with Ganan-Calvo and the '202 patent a stable capillary jet is moved out of the pressure chamber.

Ganan-Calvo fails to disclose the following claimed elements of Claims 1, 18, 24 and 25 (emphasis added):

“forcing the second fluid toward and into the first fluid stream circumference in a manner which reduces the circumference of the first fluid stream and *breaks* the stream into particles” in Claim 1;

“directing a flow of gas . . . around a circumference of the liquid stream at an angle of from about 45° to about 90° causing *the liquid and gas to physically interact*” of Claim 18;

“wherein the liquid and the gas *physically interact*” of amended Claim 23;

“the particles have dimensions smaller than any dimensions of the focused liquid stream” of Claim 24; and

“(b) creating a *violent interaction between the liquid and the gas*” of Claim 25.

Accordingly, Claims 2-6, 9-17, 21, 22, and 26 include the above limitations by way of their dependencies from Claim 1, 18, or 25 either directly or indirectly.

In contrary to the teaching of the Applicants’ invention, Ganan-Calvo teaches a method wherein “a stable liquid-gas interface is *maintained in the flow path of liquid* before entering the second opening and liquid in the flow path forms a stable capillary jet.” Claim 1 of Ganan-Calvo (emphasis added). Furthermore, Ganan-Calvo further teaches that its “aim is not to rupture the liquid-gas interface but the opposite, i.e. to increase the stability of the interface until a capillary jet is obtained.” Page 8, last paragraph of the Ganan-Calvo Description. Thus, Ganan-Calvo teaches **away** the claimed elements.

Therefore, the Applicants contend that Ganan-Calvo does not anticipate the rejected claims. In view of the above, the Applicants respectfully request that the 35 U.S.C. § 102(b) rejection of Claims 1-18 and 21-26 be withdrawn.

#### **REJECTIONS UNDER §103(A) - JENNINGS**

Claims 7 and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Jennings. Claims 7 and 8 are canceled by way of this response. Accordingly, this rejection may be withdrawn.

#### **REJECTIONS UNDER §103(A) – GANAN-CALVO**

Claims 19 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ganan-Calvo. As pointed out above, Ganan-Calvo is fundamentally deficient in failing to teach or suggest a claimed element: “directing a flow of gas . . . around a circumference of the liquid stream at an angle of from

about 45° to about 90° causing *the liquid and gas to physically interact*" of Claim 18, from which Claims 19 and 20 depend. Accordingly, Claims 19 and 20 are not obvious under 35 U.S.C. §103(a) as being obvious over Ganan-Calvo and this rejection may be withdrawn.

#### CONCLUSION

The Applicants submit that all of the claims are in condition for allowance, which action is requested. If the Examiner finds that a telephone conference would expedite the prosecution of this application, please telephone the undersigned at the number provided.

The Commissioner is hereby authorized to charge any underpayment of fees associated with this communication, including any necessary fees for extensions of time, or credit any overpayment to Deposit Account No. 50-0815, order number AERX-076CIP.

Respectfully submitted,  
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By: \_\_\_\_\_

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